

**Defense Information Infrastructure (DII)
Common Operating Environment (COE)
Statement of Functionality (SOF)
for the
METOC DBDB-V API (MADBV) Segment**

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1 SCOPE

1.1 Identification

This document describes the functionality of the Meteorological and Oceanographic (METOC) Digitized Bathymetry Database-Variable Resolution (DBDB-V) Application Program Interface (API) (MADBV) Segment of the Navy Integrated Tactical Environmental Subsystem (NITES). The MADBV segment provides APIs for the storage and retrieval of bathymetry data from the Oceanographic and Atmospheric Master Library (OAML) DBDB-V database, version 1.0.

1.2 System Overview

TEDS is the Meteorological and Oceanographic (METOC) Database for the NITES system. It is a DII COE shared database, with separate segments for different types of data and different functionalities. For each data type, there is a Database segment that provides the database schema and “static” database tables such as the Master Station Library in the LLT Observation database. There is also an Application Program Interface (API) segment that provides programming interfaces to the database. The API segments provide functionality for programs to cause data to be ingested into the database, to get a catalog of data in the database, to retrieve data by query or by individual item ID, to delete data from the database, etc. Underlying all of TEDS is a Commercial Off-the-Shelf (COTS) Relational Database Management System (RDBMS). This is currently Informix v7.2x, but could be any RDBMS.

1.3 Document Overview

Section 2 provides a more detailed overview of TEDS, while Section 3 contains more detail concerning the specific functionality provided by the MADBV segment.

2 TEDS FUNCTIONALITY OVERVIEW

The software described in this document forms a portion of the TEDS component of NITES. On 29 October 1996, the Oceanographer of the Navy issued a Program Policy statement in letter 3140 Serial 961/6U570953, modifying the Program by calling for five seamless software versions that are DII COE compliant, preferably to level 5.

The five versions are:

- NITES Version I The local data fusion center and principal METOC analysis and forecast system
- NITES Version II The subsystem on the Joint Maritime Command Information System (JMCIS) or Global Command and Control System (GCCS) (NITES/Joint METOC Segment (JMS))
- NITES Version III The unclassified aviation forecast, briefing, and display subsystem tailored to Naval METOC shore activities (currently satisfied by the Meteorological Integrated Data Display System (MIDDS))
- NITES Version IV The Portable subsystem composed of independent Personal Computers (PCs)/workstations and modules for forecaster, satellite, communications, and Integrated Command, Control, Communications, Computer, and Intelligence Surveillance Reconnaissance (IC4ISR) functions (currently the Interim Mobile Oceanographic Support System (IMOSS))
- NITES Version V Foreign Military Sales (currently satisfied by the Allied Environmental Support System (AESS))

NITES I acquires and assimilates various METOC data for use by US Navy and Marine Corps weather forecasters and tactical planners. NITES I provides these users with METOC data, products, and applications necessary to support the warfighter in tactical operations and decision making. NITES I provides METOC data and products to NITES I and II applications, as well as other systems requiring METOC data, in a heterogeneous, networked computing environment.

The NITES I Concept of Operations and system architecture require that the METOC Database be distributed both in terms of application access to METOC data and products and in terms of physical location of the data repositories. The organizational structure of the database is influenced by these requirements, and the components of this distributed database are described below.

In accordance with DII COE database concepts, the METOC Database is composed of six DII COE-compliant *shared database* segments. Associated with each shared database segment is an Application Program Interface (API) segment. The segments are arranged by data type as follows:

<u>Data Type</u>	<u>Data Segment</u>	<u>API Segment</u>
Grid Fields	MDGRID	MAGRID
LLT Observations	MDLLT	MALLT
Textual Observations and Bulletins	MDTXT	MATXT
Remotely Sensed Data	MDREM	MAREM
Imagery	MDIMG	MAIMG
Climatology Data	Segments named by data type. To date, only DBDB-V segments (MDDBV and MADBV) have been released.	

A typical client-server installation is depicted in Figure 2-1 on the next page. This shows the shared database segments residing on a DII COE SHADE database server, with a NITES I or II client machine hosting the API segments. Communication between API segments and shared database segments is accomplished over the network using American National Standards Institute (ANSI)-standard Structured Query Language (SQL).

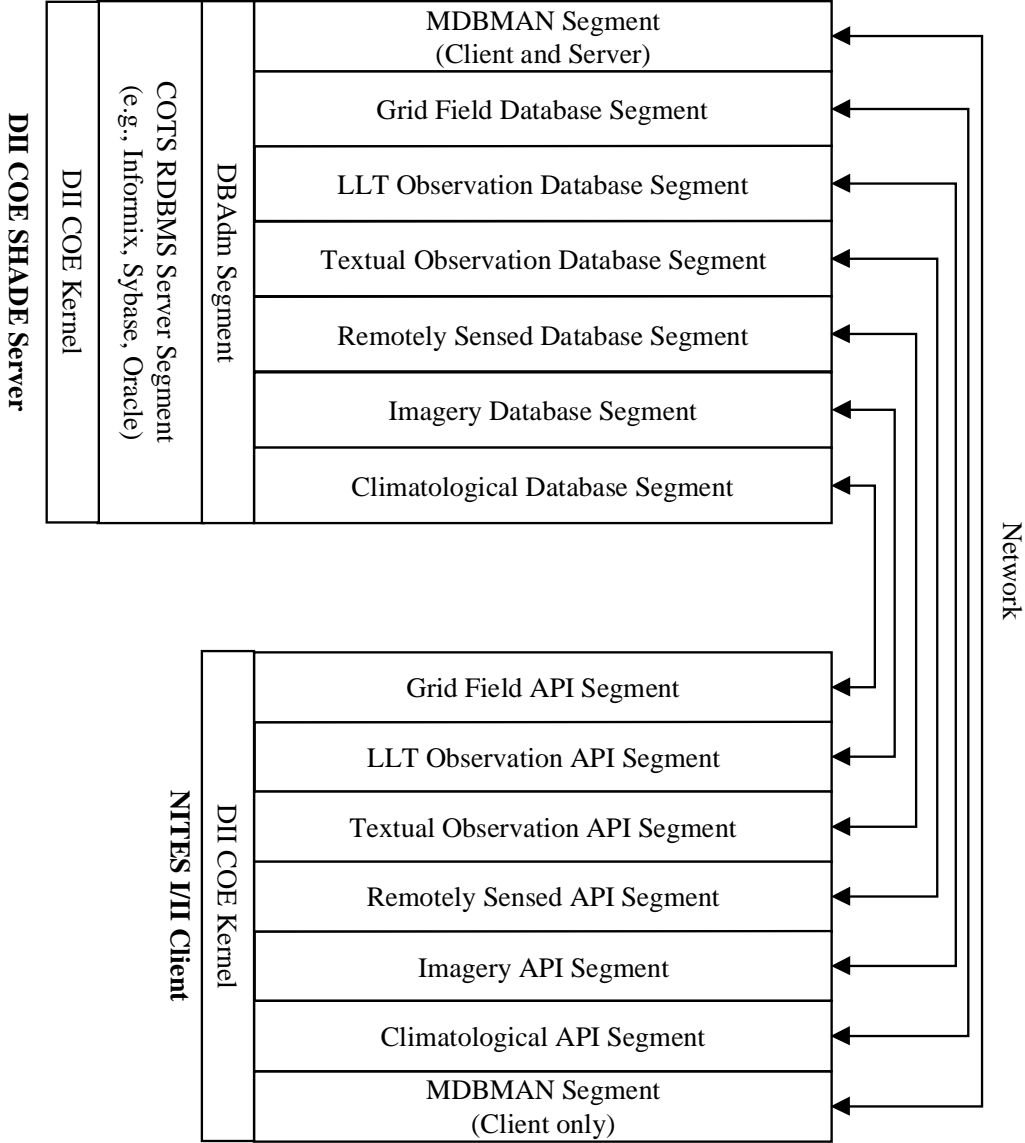


Figure 2-1. NITES METOC Database Conceptual Organization

3 MADBV SEGMENT FUNCTIONALITY

The MADBV segment deals with historic bathymetry data. The data is generated from the OAML DBDB-V data, and provides global water depth at various resolutions throughout the world.

Data Segments are static files of historic data. DII COE data segments are available over a distributed network via DII COE Kernel Service (NFS). In this case, the data segments are accessed directly by the distributed APIs (Figure 3-1). The platform running the applications needing the data must first mount the file system containing the data segment. The remote system may then access the data from the mounted drive using NFS services. Access to the mounted drive is then transparent to the application/API utilizing the data.

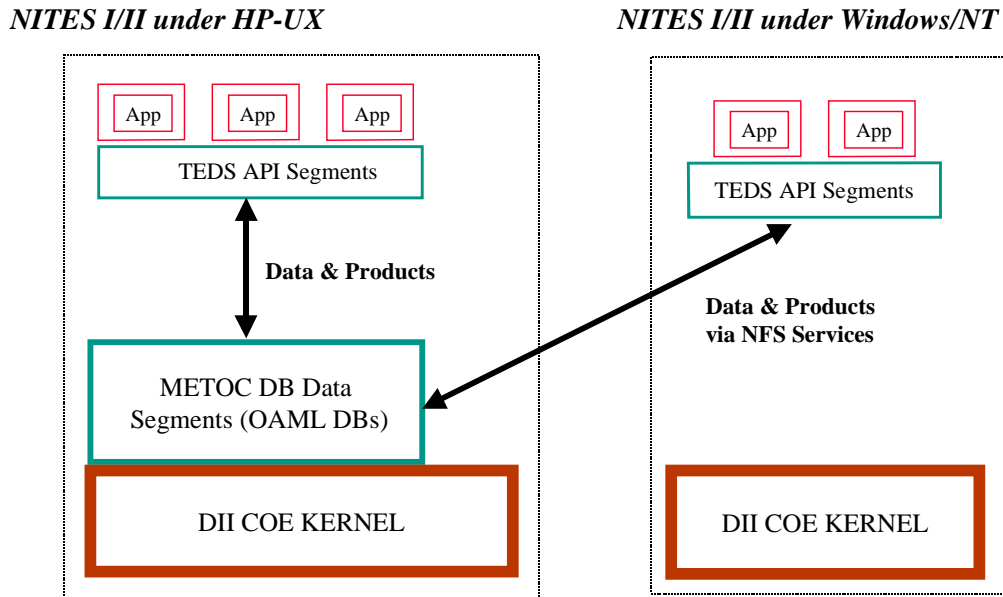


Figure 3-1. Distributed APIs via DII COE Kernel Services (NFS)

The Digitized Bathymetric Data segment consists of a static data set developed by NAVOCEANO, and a pair of bathymetry contour files generated from the NAVOCEANO data set. The Ocean Floor Depth Digital Bathymetric DataBase Variable Resolution (DBDB-V) is a digital bathymetric database that provides ocean depths at various gridded resolutions.

The NAVOCEANO developed data set for DBDB-V consists of four file types. The depth information is expressed in meters, uncorrected at an assumed sound velocity of 1500 m/s. The file types are:

- **Master Index File** – Contains a pointer or byte address to each populated 1 deg cell for each of the available resolutions.
- **Index File** – Provides a link to the detailed depth values, as well as a link to a description file associated with the depths.
- **Description File** – Provides details on the compressions, scaling, and storage of the depth information.
- **Data File** – Contains the depth values for a 1-deg cell of a specific resolution.

Two additional data files have been generated using the DBDB-V data in order to provide bathymetry contours suitable for display on a chart product. The contour data is a static global bathymetry database consisting of non-overlapping tiles of 2 degrees on a side. Tiles for areas South of 78 S were not generated, so the indexing starts at 78 S, 0 E. The file types are:

- **Index File** – Contains the number of contour levels available, and for each tile, the details each contour level and the address of the contour data in the contour data file.
- **Contour Data File** – Contains the contour segments for each contour level.

This DII COE compliant Data Segment must be installed on a file system that can be mounted by the platform running the applications that require this data. Unlike DII COE database segments, data segments are accessed directly by the associated APIs. This requires that the Data Segment be visible to the application accessing it. This visibility is accomplished by means of an NFS mount of the volume containing the data segment (Figure 3-1). If an application utilizing the MDDBV segment resides on a different machine than the database, access to the database is available via NFS services if the drive is mounted.

3.1 API Overview

There are seven public APIs utilized to access and manage the bathymetric data segment.

1. **MADBVConnect**: Establish connection to the bathymetry database.
2. **MADBVDisconnect**: Terminate the connection with the bathymetry database.
3. **MADBVGetCatalog**: Retrieve a list of the data resolutions available within the bathymetry data segment.

4. **MADBVGetTrack:** Retrieve the bathymetry along a line of bearing (track).
5. **MADBVGetGrid:** Retrieve bathymetry for a gridded area.
6. **MADBVGetContours:** Retrieve available bathymetry contours for a given area.
7. **MADBVFreeContours:** Free the memory allocated for the contours.

These APIs require that the MDDBV Data Segment has been installed on, or mounted by the platform on which applications using these APIs are running. The MDDBV data segment is configured as global data.